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Patent Claims

- 10 1. A bone-analogous coating for metallic implant materials, comprising a collagen matrix mineralized with a calcium phosphate phase.
- 15 2. A coating according to Claim 1, wherein the collagen matrix is layered. (1/22)
- 112 3. A coating according to Claim 1, wherein the calcium phosphate phase of the matrix contains amorphous calcium phosphate ( $\text{Ca}_9(\text{PO}_4)_6 \cdot n\text{H}_2\text{O}$ ), hydroxyapatite ( $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ ), octacalcium phosphate ( $\text{Ca}_8\text{H}_2(\text{PO}_4)_6 \cdot 5\text{H}_2\text{O}$ ), brushite ( $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$ ) or mixtures thereof.
- 20 4. A coating according to Claim 1, wherein the calcium phosphate phase is doped with fluoride, silver, magnesium or carbonate ions or combinations thereof.
- 25 5. A coating according to Claim 1, wherein the collagen is collagen of type I.
- 30 6. A coating according to Claim 1, wherein the collagen is a mixture of collagen of types I to III.
- 35 7. A coating according to Claims 1, wherein said coating further contains gelatin.

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~~8.~~ A coating according to Claims 1, further containing growth factors, peptide sequences, hormones, antibiotics or mixtures thereof.

5 ~~9.~~ A coated metallic implant comprising a metallic implant having an outer layer, wherein the outer layer comprises a coating according to Claim 1.

10 ~~10.~~ A coated metallic implant according to Claim 9, wherein the metallic implant is made of titanium or titanium alloy.

15 ~~11.~~ A process for the electrochemical coating of metallic implant materials with a mineralised collagen matrix comprising:

a) coating a metallic implant material by immersion in a collagen solution at a pH of less than 8 and a temperature 4 - 40°C, and

20 b) coating said metallic implant material with a calcium phosphate phase (CPP) in an electrochemically assisted process by means of galvanostatic polarization in an electrolyte solution comprising calcium ions and phosphate ions,

25 wherein process steps a) and b) are performed simultaneously or sequentially.

30 12. A process according to Claim 11, wherein an additional process step b) is placed in front of process step a).

35 13. A process according to Claim 11, wherein the process steps a) and b) proceed alternately a number of times.

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14. A process according to Claim 11, wherein the process steps a) and b) are combined into one step, the metallic implant material to be coated being electrochemically polarized cathodically in a collagen solution comprising calcium ions and phosphate ions.
15. A process according to Claim 11, wherein a cathodic current flow of  $-0.2$  to  $-50 \text{ mA/cm}^2$  flows for 25 to 40 minutes during the galvanostatic polarization in process step b).
16. A process according to Claims 11, wherein the mineralised collagen matrix is layered.
17. A process according to Claims 11, wherein the coating further comprises gelatin.
18. A process according to Claim 11, wherein a cathodic current flow of  $-0.5$  to  $-30 \text{ mA/cm}^2$  flows for 30 to 40 minutes during the galvanostatic polarization in process step b).
19. A process according to Claim 11, wherein a cathodic current flow of  $-1$  to  $-10 \text{ mA/cm}^2$  flows during the galvanostatic polarization in process step b).
20. A process according to claim 11, wherein the galvanostatic polarization in process step b) is performed at a temperature of  $30-40^\circ \text{C}$ .
21. A coated metallic implant comprising a metallic implant having an outer layer, wherein the outer layer is  $0.04-150 \mu\text{m}$  thick and comprises a coating according to Claim 1.

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